Geophysical Research Abstracts, Vol. 8, 00354, 2006
SRef-ID: 1607-7962/gra/EGU06-A-00354

Biogeochemical criteria of contamination of urban vegetation

N.V. Terekhina (1), Ufimtseva M.D. (2)

(1) Dept. of Biogeography and Nature Protection, St. Petersburg State University, Russia, (2) Earth Crust Institute, St. Petersburg State University, Russia (natalia_terekhin@mail.ru)

Investigation by estimation of modern ecological condition of megalopolises urbo-geosystems was carried out an example of one region of Saint-Petersburg.

The analysis of biogeochemical parameters has shown the presence of intensive polyelement pollution of urban vegetation. The contents of heavy metals in urban vegetation exceed background parameters, reaching dangerous levels in industrial zones. Clarkes of concentration (concentration in comparison with background data) Kk: Ba – 11.9; Cu – 9.3; Cr – 5.3; Ni and Pb – 4.3. The formed mono- and polyelement anomalies are characterized by high meanings of the same Kk, as the total parameter of plants pollution (*Zc*). In southern, east and north-east parts of the tested region with high industrial and motor transportation loading the indexes *Zc* for lime-tree bark are 40. 39 and 41 standard units accordingly, that exceeds the size of an estimated scale considered dangerous (32 standard units). The specificity of microelements accumulation is shown in the increased contents of zinc and cadmium for *Populus berolinensis* in comparison with *Tilia cordata* both under background and urban conditions (in 3.7 and 1.9 times). *Tilia cordata* absorbs more intensively such elements-pollutants as lead, chromium and nickel.

City plants keep their biogeochemical features as cationophytes, that is peculiar for plants of humid zone (cationogenic activity dominates over anionogenic activity). It is important to note, activity of anionogenic elements (Ti, Cr, V and others) increases in process of biogenic migration in urban landscapes, which is caused by increase of alkaline soil features. Value of anionogenic biogeochemical activity for city's plants (poplar and dandelion) fluctuates in limits 0.32 – 0.72, whereas this index for background landscapes is not higher than 0.27. Both indexes vary considerable by habitats,

species and organs**.**

The element content analysis of urban plants (arboreal and fruticose species, macrophytes of internal reservoirs) has shown essential physiological infringement of elements ratio. The sharp increase of the rate Fe : Mn (up to 60 and more in eluvial and aqual landscapes against 0.3 – 0.7 in background conditions) testifies the infringement of plants metabolism under the influence of man-caused factors. Other regional features are changed also, e.g. concentrations of such technogenic elements, as lead, chromium, nickel and barium in urban plants increase. Herbaceous plants accumulate high amount of titanium, iron, chromium and lead in comparison with tree leaves, that is explained by influence of high contamination of bottom air level. Ratio Fe : Mn varies from 14.6 till 214.8 (average 51.9) for grasses, and from 12.0 till 70.8 (average 28.5) for forbs, that confirms biogeochemical changes in all levels of vegetation.

The transformation of regional biogeochemical circulation of substances in urbogeosystems serves diagnostic criterion of ecological danger for genetic health of plants and animals populations.